



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

David M. Carrel, et al.

Serial No.: 10/035,506

Filed: October 22, 2001

For: A METHOD AND APPARATUS
FOR PPPOE MULTICAST
SUPPORT

Examiner: Not yet assigned

Art Unit: 2661

Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 C.F.R. §1.131

David M. Carrel, Che-lin Ho, Michael D. Tracy, and Thomas Stoner hereby
declare that:

1. We are the inventors of the above-captioned patent application and the subject matter described and claimed therein (hereinafter "the present invention").
2. Prior to August 22, 2001, (the undersigned) conceived and reduced to practice the present invention as evidenced by Exhibit A attached to this declaration. Exhibit A is an Information Internet Draft written by or at the direction of the undersigned prior to August 22, 2001. The dates on the Exhibit have been redacted. Each of the (redacted) dates on the Exhibit are prior to August 22, 2001.
3. Exhibit A describes a method for supporting PPPoE multicasts.
4. Applicant respectfully submits that Exhibit A is a reduction to practice. However, if Exhibit A is not considered a reduction to practice, Applicant respectfully submits that immediately prior to August 22, 2001 to October 22, 2001, Applicant


was diligently meeting, describing, drafting, reviewing, and filing the above-captioned patent application for the present invention.

5. Redback Networks Inc., is the assignee of the present invention.

We hereby declare that all statements herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made knowing that willful false statements and the like are punishable by fine or imprisonment, or both under § 1001 of Title 18 of United States Code, and such willful or false statements may jeopardize the validity of the above-identified application or any patent issuing therefrom.

Respectfully submitted,

Date: 11 Jan, 2002


David M. Carrel

Date: _____, 2002

Che-Lin Ho

Date: _____, 2002

Thomas M. Stoner

Date: _____, 2002

Michael D. Tracy



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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declare that:

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2. Prior to August 22, 2001, (the undersigned) conceived and reduced to practice the present invention as evidenced by Exhibit A attached to this declaration. Exhibit A is an Information Internet Draft written by or at the direction of the undersigned prior to August 22, 2001. The dates on the Exhibit have been redacted. Each of the (redacted) dates on the Exhibit are prior to August 22, 2001.
3. Exhibit A describes a method for supporting PPPoE multicasts.
4. Applicant respectfully submits that Exhibit A is a reduction to practice. However, if Exhibit A is not considered a reduction to practice, Applicant respectfully submits that immediately prior to August 22, 2001 to October 22, 2001, Applicant

was diligently meeting, describing, drafting, reviewing, and filing the above-captioned patent application for the present invention.

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We hereby declare that all statements herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made knowing that willful false statements and the like are punishable by fine or imprisonment, or both under § 1001 of Title 18 of United States Code, and such willful or false statements may jeopardize the validity of the above-identified application or any patent issuing therefrom.

Respectfully submitted,

Date: _____, 2002

David M. Carrel

Date: _____, 2002

Che-Lin Ho

Date: JANUARY 7, 2002



Thomas M. Stoner

Date: _____, 2002

Michael D. Tracy



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2. Prior to August 22, 2001, (the undersigned) conceived and reduced to practice the present invention as evidenced by Exhibit A attached to this declaration. Exhibit A is an Information Internet Draft written by or at the direction of the undersigned prior to August 22, 2001. The dates on the Exhibit have been redacted. Each of the (redacted) dates on the Exhibit are prior to August 22, 2001.
3. Exhibit A describes a method for supporting PPPoE multicasts.
4. Applicant respectfully submits that Exhibit A is a reduction to practice. However, if Exhibit A is not considered a reduction to practice, Applicant respectfully submits that immediately prior to August 22, 2001 to October 22, 2001, Applicant

was diligently meeting, describing, drafting, reviewing, and filing the above-captioned patent application for the present invention.

5. Redback Networks Inc., is the assignee of the present invention.

We hereby declare that all statements herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made knowing that willful false statements and the like are punishable by fine or imprisonment, or both under § 1001 of Title 18 of United States Code, and such willful or false statements may jeopardize the validity of the above-identified application or any patent issuing therefrom.

Respectfully submitted,

Date: _____, 2002

David M. Carrel

Date: 1/7, 2002

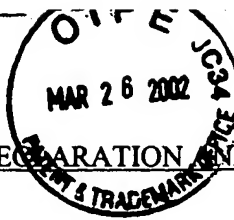
Che-Lin Ho
Che-Lin Ho

Date: _____, 2002

Thomas M. Stoner

Date: 1/7, 2002

Michael D. Tracy
Michael D. Tracy



DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND APPARATUS FOR PPPoE MULTICAST

the specification of which

 is attached hereto.

 x was filed on October 22, 2001 as

 x United States Application Number 10/035,506

 or PCT International Application Number

 and was amended on

(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

| <u>Prior Foreign Application(s)</u> | | | <u>Priority Claimed</u> | |
|---|--|---|-------------------------|---------------------|
| <u> </u> (Number) | <u> </u> (Country) | <u> </u> (Foreign Filing Date) | <u> </u> Yes | <u> </u> No |
| <u> </u> (Number) | <u> </u> (Country) | <u> </u> (Foreign Filing Date) | <u> </u> Yes | <u> </u> No |
| <u> </u> (Number) | <u> </u> (Country) | <u> </u> (Foreign Filing Date) | <u> </u> Yes | <u> </u> No |

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

| | |
|--------------------|---------------|
| Application Number | (Filing Date) |
|--------------------|---------------|

| | |
|--------------------|---------------|
| Application Number | (Filing Date) |
|--------------------|---------------|

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

| | | |
|--------------------|-------------|---|
| Application Number | Filing Date | Status -- patented, pending, abandoned |
|--------------------|-------------|---|

| | | |
|--------------------|-------------|---|
| Application Number | Filing Date | Status -- patented, pending, abandoned |
|--------------------|-------------|---|

I hereby appoint the persons listed on Appendix A hereto (which is incorporated by reference and a part of this document) as my respective patent attorneys and patent agents, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

Send correspondence to Customer No. 008791, (BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP, 12400 Wilshire Boulevard 7th Floor, Los Angeles, California 90025) and direct telephone calls to Gregg A. Peacock, Reg. No. 45,001, (512) 330-0844.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First/Sole Inventor David M. Carrel

Inventor's Signature David M. Carrel

Date 19 Oct 01

Residence Belvedere, California 94920

Citizenship USA

Post Office Address 210 Beach Road

Belvedere, California 94920

Full Name of Second/Joint Inventor Che-Lin Ho

Inventor's Signature _____

Date _____

Residence Zephyr Cove, Nevada

Citizenship USA

Post Office Address PO Box 10195

Zephyr Cove, Nevada 89448

Full Name of Fourth/Joint Inventor Thomas M. Storer

Inventor's Signature _____

Date _____

Residence Fremont, California

Citizenship USA

Post Office Address 39939 Stevenson Common #1081

Fremont, California 94538

Full Name of Fifth/Joint Inventor Michael D. Tracy

Inventor's Signature _____

Date _____

Residence Foster City, California

Citizenship USA

Post Office Address 1258 Malta Lane

Foster City, California 94404

APPENDIX A

William E. Alford, Reg. No. 37,764; Farzad E. Amini, Reg. No. 42,261; William Thomas Babbitt, Reg. No. 39,591; Carol F. Barry, Reg. No. 41,600; Jordan Michael Becker, Reg. No. 39,602; Lisa N. Benado, Reg. No. 39,995; Bradley J. Berezna, Reg. No. 33,474; Michael A. Bernadicou, Reg. No. 35,934; Roger W. Blakely, Jr., Reg. No. 25,831; R. Alan Burnett, Reg. No. 46,149; Gregory D. Caldwell, Reg. No. 39,926; Thomas M. Coester, Reg. No. 39,637; Donna Jo Coningsby, Reg. No. 41,684; Florin Corie, Reg. No. 46,244; Dennis M. deGuzman, Reg. No. 41,702; Stephen M. De Klerk, Reg. No. 46,503; Michael Anthony DeSanctis, Reg. No. 39,957; Daniel M. De Vos, Reg. No. 37,813; Justin M. Dillon, Reg. No. 42,486; Sanjeet Dutta, Reg. No. 46,145; Matthew C. Fagan, Reg. No. 37,542; Tarek N. Fahmi, Reg. No. 41,402; George Fountain, Reg. No. 37,374; James Y. Go, Reg. No. 40,621; James A. Henry, Reg. No. 41,064; Libby N. Hope, Reg. No. 46,774; Willmore F. Holbrow III, Reg. No. 41,845; Sheryl Sue Holloway, Reg. No. 37,850; George W. Hoover II, Reg. No. 32,992; Eric S. Hyman, Reg. No. 30,139; William W. Kidd, Reg. No. 31,772; Sang Hui Kim, Reg. No. 40,450; Walter T. Kim, Reg. No. 42,731; Eric T. King, Reg. No. 44,188; George Brian Leavell, Reg. No. 45,436; Kurt P. Leyendecker, Reg. No. 42,799; Gordon R. Lindeen III, Reg. No. 33,192; Jan Carol Little, Reg. No. 41,181; Robert G. Litts, Reg. No. 46,876; Joseph Lutz, Reg. No. 43,765; Michael J. Mallie, Reg. No. 36,591; Andre L. Marais, under 37 C.F.R. § 10.9(b); Paul A. Mendonsa, Reg. No. 42,879; Clive D. Menezes, Reg. No. 45,493; Richard A. Nakashima, Reg. No. 42,023; Chun M. Ng, Reg. No. 36,878; Thien T. Nguyen, Reg. No. 43,835; Thinh V. Nguyen, Reg. No. 42,034; Dennis A. Nicholls, Reg. No. 42,036; Robert B. O'Rourke, Reg. No. 46,972; Daniel E. Ovanezian, Reg. No. 41,236; Kenneth B. Paley, Reg. No. 38,989; Gregg A. Peacock, Reg. No. 45,001; Marina Portnova, Reg. No. 45,750; Randol W. Read, Reg. No. 43,876; William F. Ryann, Reg. No. 44,313; James H. Salter, Reg. No. 35,668; William W. Schaal, Reg. No. 39,018; James C. Scheller, Reg. No. 31,195; Jeffrey S. Schubert, Reg. No. 43,098; George P. Simion, Reg. No. 47,089; Jeffrey Sam Smith, Reg. No. 39,377; Maria McCormack Sobrino, Reg. No. 31,639; Stanley W. Sokoloff, Reg. No. 25,128; Judith A. Szepesi, Reg. No. 39,393; Ronald S. Tamura, Reg. No. 43,179; Vincent P. Tassinari, Reg. No. 42,179; Edwin H. Taylor, Reg. No. 25,129; John F. Travis, Reg. No. 43,203; Joseph A. Twarowski, Reg. No. 42,191; Tom Van Zandt, Reg. No. 43,219; Lester J. Vincent, Reg. No. 31,460; Glenn E. Von Tersch, Reg. No. 41,364; John Patrick Ward, Reg. No. 40,216; Mark L. Watson, Reg. No. 46,322; Thomas C. Webster, Reg. No. 46,154; and Norman Zafman, Reg. No. 26,250; my patent attorneys, and Firasat Ali, Reg. No. 45,715; Peggy Susan Howard Avalos, Reg. No. 42,274; Thomas S. Ferrill, Reg. No. 42,532; Charles P. Landrum, Reg. No. 46,855; and Raul Martinez, Reg. No. 46,904, my patent agents, of BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP, with offices located at 12400 Wilshire Boulevard, 7th Floor, Los Angeles, California 90025, telephone (310)207-3800; and James R. Thein, Reg. No. 31,710, my patent attorney, with offices at 2231 Crystal Drive, Suite 108, Arlington, VA 22202, telephone (703)521-6525; with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

APPENDIX B

Title 37, Code of Federal Regulations, Section 1.56 Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.



DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND APPARATUS FOR PPPoE MULTICAST

the specification of which

 is attached hereto.

 x was filed on October 22, 2001 as

 x United States Application Number 10/035,506

 or PCT International Application Number

 and was amended on

(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

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|-------------------------------------|------------------|------------------------------|-------------------------|-------------|
| <u>(Number)</u> | <u>(Country)</u> | <u>(Foreign Filing Date)</u> | <u>Yes</u> | <u>No</u> |
| <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |
| <u>(Number)</u> | <u>(Country)</u> | <u>(Foreign Filing Date)</u> | <u>Yes</u> | <u>No</u> |
| <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |
| <u>(Number)</u> | <u>(Country)</u> | <u>(Foreign Filing Date)</u> | <u>Yes</u> | <u>No</u> |
| <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |

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| Application Number | Filing Date | Status -- patented, pending, abandoned |
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Full Name of First/Sole Inventor David M. Carrel

Inventor's Signature _____ Date _____

Residence Belvedere, California 94920 Citizenship USA

Post Office Address 210 Beach Road
Belvedere, California 94920

Full Name of Second/Joint Inventor Che-Lin Ho

Inventor's Signature _____ Date _____

Residence Zephyr Cove, Nevada Citizenship USA

Post Office Address PO Box 10195
Zephyr Cove, Nevada 89448

Full Name of Fourth/Joint Inventor Thomas M. Stoner

Inventor's Signature Thomas M. Stoner Date November 8, 2001

Residence Raleigh, North Carolina Citizenship USA

Post Office Address 10812 Rio Bluff Drive #307
Raleigh, North Carolina 27614

Full Name of Fifth/Joint Inventor Michael D. Tracy

Inventor's Signature _____ Date _____

Residence Foster City, California Citizenship USA

Post Office Address 1258 Malta Lane
Foster City, California 94404

APPENDIX A

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APPENDIX B

Title 37, Code of Federal Regulations, Section 1.56 Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) Prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.



DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND APPARATUS FOR PPPoE MULTICAST

the specification of which

_____ is attached hereto.
_____ x was filed on October 22, 2001 as
_____ x United States Application Number 10/035,506
_____ or PCT International Application Number _____
_____ and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

| <u>Prior Foreign Application(s)</u> | | | <u>Priority Claimed</u> | |
|-------------------------------------|--------------------|---------------------------------|-------------------------|-----------|
| _____ (Number) | _____ (Country) | _____ (Foreign Filing Date) | <u>Yes</u> | <u>No</u> |
| _____ (Number) | _____ (Country) | _____ (Foreign Filing Date) | <u>Yes</u> | <u>No</u> |
| _____ (Number) | _____ (Country) | _____ (Foreign Filing Date) | <u>Yes</u> | <u>No</u> |

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

| | |
|--------------------|---------------|
| Application Number | (Filing Date) |
|--------------------|---------------|

| | |
|--------------------|---------------|
| Application Number | (Filing Date) |
|--------------------|---------------|

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

| | | |
|--------------------|-------------|---|
| Application Number | Filing Date | Status -- patented, pending, abandoned |
|--------------------|-------------|---|

| | | |
|--------------------|-------------|---|
| Application Number | Filing Date | Status -- patented, pending, abandoned |
|--------------------|-------------|---|

I hereby appoint the persons listed on Appendix A hereto (which is incorporated by reference and a part of this document) as my respective patent attorneys and patent agents, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

Send correspondence to Customer No. 008791, (BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP, 12400 Wilshire Boulevard 7th Floor, Los Angeles, California 90025) and direct telephone calls to Gregg A. Peacock, Reg. No. 45,001, (512) 330-0844.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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APPENDIX A

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APPENDIX B

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(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

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(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

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(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.



EXHIBIT A

COPY OF PAPERS
ORIGINALLY FILED

4.

PPP Working Group
INTERNET DRAFT
Category: Informational

Untitled
David Carrel, Dan Simone,
Che-Lin Ho, Tom Stoner, Mike Tracy
Redback Networks, Inc.

Title: draft-carrel-info-pppoe-ext-00d.txt

Extensions to a Method for Transmitting PPP Over Ethernet (PPPoE)
<draft-carrel-info-pppoe-ext-00d.txt>

Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of Section 10 of RFC 2026.

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Abstract

The Point-to-Point Protocol (PPP) [1] provides a standard method for transporting multi-protocol datagrams over point-to-point links. PPPoE [2] describes how to build PPP sessions and encapsulate PPP packets over Ethernet.

This document describes extensions to PPPoE. These extensions

provide added functionality, but are optional and preserve compatibility.

Carrel

[Page1]

INTERNET DRAFT

1. Introduction

PPP over Ethernet (PPPoE) [2] provides the ability to connect a network of hosts over a simple Ethernet bridging access device to a remote Access Concentrator. With this model, each host utilizes its own PPP stack and the user is presented with a familiar user interface. Access control, billing and type of service can be done on a per-user, rather than a per-site, basis.

The flexibility provided by PPPoE has inspired the development of several extensions to the protocol. These extensions provide for networking level enhancements as well as session level enhancements aimed at the user experience. These enhancements maintain backwards compatibility with the core PPPoE protocol.

2. Conventions

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in [3].

3. Discovery Stage

The PADI, PADO, PADR, PADS and PADT defined in [2] are unchanged. The following discovery packet has been added. Since this is the Discovery Stage, an ETHER_TYPE of 0x8863 is used.

3.1 The PPPoE Active Discovery Message (PADM) packet

An Access Concentrator MAY send a PADM at any time while a session is active to convey informational messages to the Host. The DESTINATION_ADDR is the unicast address of the Host. The CODE field is set to 0xd3 and the SESSION_ID MUST be set to the current (active) SESSION_ID value.

Use of this packet is optional for both the Access Concentrator and the Host. A PADM packet MUST contain at least one TAG of type HURL or MOTM and SHOULD NOT contain any other TAGs. Additional messaging TAGs may be defined in the future that are appropriate for PADM packets.

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INTERNET DRAFT

3.1 The PPPoE Active Discovery Network (PADN) packet

An Access Concentrator MAY send a PADN at any time while a session is active to convey network level information to the Host. The DESTINATION_ADDR is the unicast address of the Host. The CODE field is set to 0xd4 and the SESSION_ID MUST be set to the current (active) SESSION_ID value.

An Access Concentrator SHOULD send a PADN as soon as possible after an NCP completes negotiation. That PADN SHOULD only contain TAGs that are appropriate for that NCP. Since there is no limit on the number of PADNs that may be sent, it is appropriate to send a PADN for each NCP.

Use of this packet is optional for both the Access Concentrator and the Host, though in general it is expected that it will only be sent by the Access Concentrator. A PADN packet MUST contain at least one

Untitled

TAG of type IP_ROUTE_ADD and SHOULD NOT contain any other TAGs. Additional network TAGs may be defined in the future that are appropriate for PADN packets.

4. PPP Session Stage

Normal PPPoE unicast Session communication is unchanged from [2]. However enhancements have been made to support Multicast at the PPPoE (Ethernet) level.

4.1 PPPoE Multicast Optimization

The PPPoE session stage is extended to include multicast Ethernet packets. When doing IP Multicast, it is desirable for a single copy of a packet to reach as many destinations hosts as possible. This same behavior is desirable when multiple PPPoE Hosts can be reached via the same Ethernet. To accomplish this, a PPPoE packet that is destined to an IP multicast group MAY be multicast at the PPPoE level. Such a packet MUST use an Ethernet multicast DESTINATION_ADDR, and a PPPoE SESSION_ID of 0xffff to reach multiple PPPoE Hosts. The Ethernet multicast DESTINATION_ADDR is determined by using that same mapping that IP multicast uses over Ethernet. See [4] for details. The SESSION_ID value of 0xffff is reserved in [2] for PPPoE multicast packets. Before an Access Concentrator may use PPPoE Multicast to reach a Host, the Host MUST indicate if it is PPPoE multicast capable by using the Multicast-Capable TAG during Discovery Stage.

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INTERNET DRAFT

How a host joins an IP Multicast group is beyond the scope of this document.

An example packet is shown in Appendix B.

5. PPP Considerations

If Multicast is to be used, then PPP encryption and compression **MUST NOT** be used. In addition LQM may have difficulties with Multicast environments and it **SHOULD NOT** be used in conjunction with PPPoE multicast.

PADM packets **SHOULD** be sent after PPP authentication has completed in order to provide per-user messaging. Also PADM packets containing HURL TAGs **SHOULD** be sent after an NCP is established so that network connectivity is available for the web browser. However a Host implementation **MUST** be able to receive one at any time after PPPoE session establishment.

6. Other Considerations

UTF-8 [5] is used throughout this document instead of ASCII. UTF-8 supports the entire ASCII character set while allowing for international character sets as well. See [5] for more details.

7. Security Considerations

All data confidentiality and authenticity issues are left to higher layers such as PPP or IP. As such, any information sent in a PADM packet can not be protected. To present data to a user in a secure manner, HURLs can be used to establish a connection over higher layers that do provide security.

8. Acknowledgments

Copious amounts of text were stolen from RFC 2516.

Carrel

[Page4]

INTERNET DRAFT

9. References

- [1] Simpson, W., "The Point-to-Point Protocol (PPP)", STD 51, RFC 1661, July 1994
- [2] Mamakos, et. al., "A Method for Transmitting PPP Over Ethernet (PPPoE)", RFC 2516, February 1999
- [3] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [4] Deering, S., "Host Extensions for IP Multicasting", RFC 1112, August 1989.
- [5] Yergeau, F., "UTF-8, a transformation format of ISO 10646", RFC 2279, January 1998.
- [6] Berners-Lee, T., Masinter, L., and McCahill, M. "Uniform Resource Locators (URL)", RFC 1738, December 1994

Appendix A

TAG_TYPES and TAG_VALUES

0x0106 Multicast-Capable

This TAG MUST be added by a HOST to a PADR packet if the Host is capable of receiving multicast PPPoE packets as described in the Multicast Optimization section. If an Access Concentrator does not receive this TAG then it MUST assume the Host is not capable of doing the Multicast Optimization. The TAG_LENGTH MUST be at least one. The first octet of the TAG_VALUE MUST contain a numeric PPPoE-Multicast version number and the following octets

MAY contain version specific information.

Currently only PPPoE-Multicast version 0 is defined. The TAG_LENGTH MUST be one with a TAG_VALUE of 0x00. This version specifies that PPPoE multicast packets may only be sent from the Access Concentrator to the Host.

0x0111 HURL

This TAG MAY be added to PADM packets by the Access Concentrator. It contains a URL that the Host MAY pass to a web browser for presentation to the user. The TAG_VALUE contains a standard URL [6]. It is an UTF-8 string which is not NULL terminated.

Carrel

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INTERNET DRAFT

0x0112 MOTM

This TAG MAY be added to PADM packets by the Access Concentrator. It contains a Message Of The Minute (MOTM) that the Host MAY display to the user. The TAG_VALUE contains an UTF-8 string which is not NULL terminated. It is a text message that is presentable to the user on the Host.

0x0121 IP_ROUTE_ADD

This TAG MAY be added to PADN packets by the Access Concentrator. It contains a IP route that MAY be used by the Host to populate it's routing table. The behavior of PPP is not defined in terms of what routes should be installed if multiple concurrent PPP sessions exist. Many client implementations will install a default route but that only works if one PPP session is active. When multiple PPPoE sessions are active, the IP_ROUTE_ADD TAG can provide a more granular set of routes to the client. The TAG_VALUE contains four 32 bit integers in network byte order. The first integer contains a destination network number and the second contains a destination network mask. The third integer

contains the gateway IP address. The fourth integer contains a metric value. The destination of the route is always assumed to be the remote end of the PPP link. If the first two integers are zero this indicates a default route. In general the gateway IP address will be the same as the Access Concentrators's IP address on that PPP session, because use of this tag is only intended to provide routing information about the first hop (ie. which PPP interface the client should use).

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Appendix B

The following are some example packets:

A PADM packet:

| | 1 | 2 | 3 |
|---|---|---|---|
| 0 | 1 | 2 | 3 |
| 1 | 2 | 3 | 4 |
| 2 | 3 | 4 | 5 |
| 3 | 4 | 5 | 6 |
| 4 | 5 | 6 | 7 |
| 5 | 6 | 7 | 8 |
| 6 | 7 | 8 | 9 |
| 7 | 8 | 9 | 0 |
| 8 | 9 | 0 | 1 |
| 9 | 0 | 1 | 2 |

Untitled

```

+-----+-----+-----+-----+-----+-----+-----+-----+
|                               Host_mac_addr                               |
+-----+-----+-----+-----+-----+-----+-----+-----+
| Host_mac_addr (cont) | Access_Concentrator_mac_addr |
+-----+-----+-----+-----+-----+-----+-----+-----+
|                               Access_Concentrator_mac_addr (cont)       |
+-----+-----+-----+-----+-----+-----+-----+-----+
| ETHER_TYPE = 0x8863 | v = 1 | t = 1 | CODE = 0xd3 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| SESSION_ID = 0xNNNN | LENGTH = 0x001a |
+-----+-----+-----+-----+-----+-----+-----+-----+
| TAG_TYPE = 0x0111 | TAG_LENGTH = 0x0016 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 0x68 | 0x74 | 0x74 | 0x70 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 0x3a | 0x2f | 0x2f | 0x77 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 0x77 | 0x77 | 0x2e | 0x72 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 0x65 | 0x64 | 0x62 | 0x61 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 0x63 | 0x6b | 0x2e | 0x63 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 0x6f | 0x6d |
+-----+-----+-----+-----+-----+-----+-----+-----+

```

INTERNET DRAFT

A PADN packet: This contains two IP_ROUTE_ADD TAGs. The first is the route "10.1.1.0 255.255.255.0". The second is "20.2.0.0 255.255.0.0". The Access Concentrator's IP address for the PPPoE session is 10.1.1.1.

```

      1      2      3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|                               |
|      Host_mac_addr           |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|  Host_mac_addr (cont)  | Access_Concentrator_mac_addr |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      Access_Concentrator_mac_addr (cont)          |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|  ETHER_TYPE = 0x8863      | v = 1 | t = 1 | CODE = 0xd4 |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|  SESSION_ID = 0xNNNN      |  LENGTH = 0x0028          |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|  TAG_TYPE = 0x0121        |  TAG_LENGTH = 0x0010      |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      0x0a010100           |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      0xffffffff00         |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      0x0a010101           |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      0x00000001           |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|  TAG_TYPE = 0x0121        |  TAG_LENGTH = 0x0010      |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      0x14020000           |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      0xffff0000           |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      0x0a010101           |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|      0x00000001           |
|--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+

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INTERNET DRAFT

A PPP IP Multicast packet: The PPP protocol value is shown (0x0021) but the IP payload is left to the reader. This is a packet from the Access Concentrator to the Host.

```

      1           2           3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|                               |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
| Host_mac_addr (cont) | Access_Concentrator_mac_addr |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
| Access_Concentrator_mac_addr (cont) |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
| ETHER_TYPE = 0x8864   | v = 1 | t = 1 | CODE = 0x00 |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
| SESSION_ID = 0xffff   | LENGTH = 0x????   |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
| PPP PROTOCOL = 0x0021 | IP payload      ~
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+

```

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